

# STATE OF ALASKA

SEAN PARNELL, GOVERNOR

## DEPARTMENT OF NATURAL RESOURCES

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Via E-mail and U.S. First Class Mail

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Office of Environmental Information (OEI) Docket (Mail Code 2822T)  
Docket # EPA-HQ-ORD-2012-0276  
U.S. Environmental Protection Agency  
1200 Pennsylvania Ave., N.W.  
Washington, DC 20460  
[ORD.Docket@epa.gov](mailto:ORD.Docket@epa.gov)

Re: State of Alaska's Technical Comments on EPA's May 2012 External  
Review Draft of "An Assessment of Potential Mining Impacts on  
Salmon Ecosystems of Bristol Bay, Alaska;"  
Docket # EPA-HQ-ORD-2012-0276

Dear Ms. Jackson and Mr. McLerran:

The State of Alaska, through the Department of Natural Resources (ADNR) Office of Project Management and Permitting (OPMP), submits these comments in response to the U.S. Environmental Protection Agency (EPA) draft document "An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska" ("Assessment"). Please note that these comments do not endorse the Assessment contents, process or any premature exercise of EPA's Clean Water Act Section 404(c) authority in Bristol Bay watersheds.

ADNR, through OPMP, coordinates review of mining and other development projects in Alaska that involve multiple state agencies (see Alaska Statutes Sec. 27.05.010). OPMP does not regulate mines but coordinates activities of

*"To responsibly develop Alaska's resources by making them available for  
maximum use and benefit consistent with the public interest."*

resource agencies that do. This letter, along with its enclosure, includes input from the Alaska Departments of Natural Resources (ADNR), Fish and Game (ADF&G), Environmental Conservation (ADEC), Transportation, and Commerce, Community and Economic Development. In addition to this letter of technical comments from the agencies, the State of Alaska, through the Attorney General's Office, is submitting comments on legal and process issues with the Assessment today.

The State's review of the Assessment was conducted by resource agency technical staff from many disciplines including habitat biology, engineering, risk assessment, hydrology, geology, and chemistry. Most of the reviewers actively review, regulate, permit and inspect current and potential mining operations in Alaska. These staff represent hundreds of years of direct experience studying and managing Alaska's natural resources.

The State, in previous letters to EPA, has questioned the applicability of the Assessment process in the absence of a detailed project proposal. The Assessment has not incorporated the effects of permit stipulations and mitigation on the overall impact on the risks. Permit stipulations and mitigation through the permitting process would be an integral part of any large development project in the region. Without considering the robustness and completeness of the state and federal permitting processes, the Assessment has mischaracterized the impacts and their significance.

In the State's view, the Bristol Bay fishery is a world-class resource recognized by Alaskans and others long before EPA's assessment. Many years of effective management by ADF&G have focused on maintaining a robust fishery and supporting habitat. Characterizing this important fishery was the least difficult charge before EPA in its development of the Assessment.

The Assessment acknowledges that most fish and game populations in the Bristol Bay watershed are healthy and robust. The Assessment appropriately characterizes and summarizes the available information on the abundance, diversity, productivity, and uses of the fish and wildlife resources of the Bristol Bay region. In addition, the sections of the Assessment that address Alaska Native cultures and subsistence portray the role that salmon plays in the culture and way of life of the Bristol Bay communities and residents.

However, as reflected in the technical comments from the State, EPA was far less successful in characterizing mine development, determining the likelihood of failures, identifying mitigation measures, and assessing likely impacts of mine development. Nor does the Assessment acknowledge the relative importance of subsistence uses to all Bristol Bay area residents.

Existing state resource agency review, permitting and management processes have been successful in addressing potential impacts to our fish and game

resources from a wide range of anthropogenic effects including large scale mining, and would certainly be instrumental in addressing potential impacts from mine development in the Bristol Bay region.

Detailed technical comments on the Assessment are enclosed. Highlights of the technical comments follow:

**I. The assessment draws speculative conclusions about potential impacts from a hypothetical large mine**

The Assessment contemplates potential adverse impacts from a hypothetical mine scenario that could result in EPA placing unnecessary or inappropriate Section 404(c) limits on future development. The Assessment draws from earlier conceptual plans prepared by Northern Dynasty Minerals Ltd. (NDM). The Assessment also mentions other potential mining operations in the area that are in very early exploration status such as the Groundhog, Humble and Big Chunk projects.

It is difficult to make technical observations regarding the mine development model used in the Assessment because the basis of the model is comprised of a number of assumptions, not site-specific data or actual mine plans. While the hypothetical mine and scenarios described by EPA may appear to be realistic, based on a given set of conditions, they do not represent the only options and outcomes that could apply to a mine located in the Bristol Bay area that is in planning, development, operational or closure stages. Thus, the Assessment does not provide an accurate assessment of potential mine development impacts. For example:

- The Assessment has virtually no discussion on the local and regional geology and hydrogeology which would be a required part of state agency review of any proposed mine project. The Assessment only mentions field investigations and testing from previous exploration programs. However, site-specific data exists on key aspects of the subsurface environment, but that information was not considered in the assessment of direct hydrologic impacts and its effects on fish and habitat. An obvious source for site-specific data is the Pebble Limited Partnership (PLP) Environmental Baseline Document (EBD), a 27,000 page document released in November, 2011.
- The Assessment does not adequately consider Alaska regulations, standards, or the mitigating aspects of modern mine construction methods, operation, and closure. The Assessment provides a very basic review from dated mining projects outside of this region that do not adhere to modern mining methods, regulations, or engineering

standards. These examples, which may have no applicability to this study area, were used to predict potential impacts to the study area.

- EPA states that the mine scenarios described in the Assessment reflect “current good, but not necessarily best, mining practices” for porphyry copper mining. Therefore, the assumptions made by the EPA based on “good practices” may not reflect the “best practices” that may be used by an actual mining operation or that may be required by state or federal regulatory agencies through the permitting process for a large mine. This approach is unrealistic considering the amount of scrutiny expected from the public and the requirements of the regulatory agencies that issue permits and approvals for mines in Alaska.
- The hypothetical inflows and outflows of a speculative design do not constitute a water balance. A fundamental element in any mine review is an accurate water balance for the project. The Assessment attempts to describe the negative hydrological effects of a conceptual and unpermitted facility, but an understanding of water balance cannot be reached in the absence of a detailed proposal, including proposed water use within the facility itself.
- A tailings storage facility dam failure is the single most significant potential impact of the dam. Yet no site-specific sediment volumes are estimated or calculated and no site-specific sediment transport study was completed. The generalized discussion in these “failure” sections includes some description, but there is no substantiating evidence to support the hypotheses.

## **II. Insufficient technical and scientific support for conclusions based on groundwater/surface water interconnections in the study area**

In the Assessment and at the public meetings in Alaska and Seattle, EPA emphasized the interconnection of groundwater and surface water in the study area. The Assessment does not describe how site-specific studies at potential development sites would determine the potential and risk of changes to groundwater and resulting impacts to fresh water. For example:

- The Assessment does not take into account the seasonal fluctuations of groundwater and surface water flow and its effect on determining impacts from the mining scenario. Furthermore, the Assessment does not consider the substantial amount of information contained in the EBD. This includes information needed to determine the rates of groundwater flow, soils composition, porosity, hydraulic conductivities,

permeability, presence of permafrost, fracturing in bedrock and other important aspects of groundwater before any mine development.

- There are hundreds of references to groundwater in the Assessment and it is repeatedly listed as a key factor in fish habitat and other wildlife habitat functions. Yet, hydrogeology within the proposed pit and tailings storage facilities is not described in the Assessment.
- The Assessment assumes that the mine would be located on a water divide and there will be little groundwater contribution into the area defined by the cone of depression. However, the surface water divide does not necessarily match the groundwater divide. The Assessment did not evaluate regional groundwater flow to determine the location of the groundwater divide.
- The amount of water used during mining operations is not consistently reported in the Assessment. This has major implications to the water balance, instream flows, and the health of fisheries below the hypothetical mine. Dewatering and mining activities in the mine site will change the local, and possibly the regional, groundwater flow field, which will change the water balance.
- The Assessment does not adequately consider the complex, site-specific and stream flow conditions and relate the information directly to measured fish/salmon presence and potential impact. The EBD contains information that shows gaining and losing reaches in the area of study. However, the Assessment does not include sufficient information on groundwater / surface water interactions that must be used to estimate impacts to fish habitat from mining activity.

### **III. Inadequate consideration of mitigation measures**

The Assessment references "potential mitigation measures." Aside from the efficacy of mitigation discussion in Appendix I, there is little evidence of mitigation measures being considered and incorporated into the hypothetical mine design and into the main chapters of the Assessment. In addition there is inconsistent use of the terms "conventional", "standard" and "best" mitigation practices throughout the Assessment. For example:

- The Assessment discusses culverts as a risk to fish habitat and passage. The State has communicated to PLP that bridge designs, not culverts, will be the starting point for consideration of all proposed water crossings. Effective culvert designs can accommodate fish passage in some instances. State inspection programs along development project

corridors monitor and prevent the long-term impacts described in the Assessment. Given the sensitivity of the rivers and streams to the fisheries, the inferior designs described in the draft Assessment would not be approved by the State.

- In the Assessment, there is no discussion of the mitigation requirements that could be imposed by the Army Corps of Engineers (Corps) relative to the placement of roads and stream crossings or mitigation to and avoidance of wetlands. Additionally, the Alaska Department of Environmental Conservation (ADEC) reviews all Corps permit applications to determine if there are reasonable and appropriate assurances that water quality standards will be met to protect aquatic life.

The technical comments enclosed highlight numerous examples where mitigation measures at all stages of mine construction, development, operation and closure were not adequately characterized in the Assessment.

#### **IV. Data presented is not representative, complete or current**

In reviewing the Assessment as a scientific and technical document, the State noted EPA's choice of some references used, the use of outdated sources, and selective bias in the data and information featured in the Executive Summary (ES) and main Assessment chapters. In particular, the ADF&G had many additional sources of fisheries data readily available from that agency which are listed in the attached technical comments but were not considered in the Assessment.

In several instances, EPA chose the most conservative measure, data, counts, and indexes to determine potential impact from mining in the area of study. This repeatedly led to the conclusion that greater or more extensive impacts would occur than what may be realistic for the hypothetical mine scenario. The Assessment does not acknowledge data that is available in the EBD which, upon further research and study, may change the conclusions regarding risks and impacts. Further, there are sections of the Assessment that selectively use generalized and conservative assumptions over available field-collected data. Standard risk assessment protocols favor the use of actual, site specific data over generalizations, assumptions, and modeling. The draft Assessment does not follow these longstanding risk assessment protocols. Specific examples of bias in selecting data include:

- Overstatement of risk from road runoff based on literature describing environmental problems with residues from urban hard surface roads such as road salting, metals, oil and grease, high volumes of traffic, and

other impacts. Mine project roads and traffic could have very different impacts. The State technical comments provide more applicable and recent literature to consider.

- The Assessment inappropriately uses the output from a toxicity calculation method (biotic ligand model) on pre-Tertiary waste rock leachate to infer site-specific, downstream impacts without necessary consideration of kinetics, downstream mixing and pH changes. Instead of using field-collected data available from the EBD, the Assessment uses the most conservative input criteria in the model, leading to even a more conservative result.
- Not mentioned in the Assessment is that EPA approved the State of Alaska Water Quality Standards as being protective of aquatic life and that no state has fully adopted the biotic ligand methodology for setting statewide water quality standards. The necessity of a water quality model to determine the need for more stringent, site-specific water quality criteria requires a far more detailed study than what was presented in the Assessment. The resultant use of this stringent water quality approach as a standard of measure leads to an erroneous conclusion where the predicted water quality impact to aquatic life is potentially substantially greater than what would be calculated in a well researched and technically reviewed study.
- The information on the roads and pipeline do not point out that some road sections out of Williamsport and around Pedro Bay have already been constructed. This omission may lead readers to assume that only a mining project would necessitate roads and road building in the study area.
- In Chapter 4, the Assessment provides examples of catastrophic dam failures, and further describes failure mechanisms, such as overtopping and slope instability and then discusses failure statistics. However, the Assessment fails to point out that the failure statistics, as presented, do not distinguish catastrophic failures from relatively inconsequential incidents. This effectively exaggerates the probability of failure of the dam in the hypothetical mine scenario.
- All of the dams described are less than 30 meters high, and have questionable design and operational histories. The Assessment has estimated the likelihood of failure of the hypothetical mine dam using historic records of dam failures recorded in the years 1960 to 2010. Many were constructed in periods prior to current regulatory, engineering, and oversight requirements. The Assessment does not acknowledge that the tailings dam failure statistics presented are biased by the failure incidents of small dams, because there have been no

catastrophic failure of large dams approaching the scale of the mine scenarios used in the Assessment.

- The Assessment provides examples of impacts from mines developed from the late 1800 and early 1900s, related to acid mine drainage and mobilization of metals and does not distinguish nor consider current mine technology or regulatory framework and oversight to prevent environmental harm. These historic examples do not apply directly to a modern mine under current regulatory regimes.
- Rather than using best available fish abundance data, the Assessment uses the highest index counts with an unsupported justification that it is "likely" to be representative. By applying the highest index count across an entire stream system, or even across large areas or reaches of the stream where spawning may or may not occur (because spawning is generally restricted to particular reaches or habitat conditions that do not exist everywhere in the stream), the Assessment may have overestimated the number of potentially impacted fish.
- Salmon reductions caused by mining are speculated to "cause roughly proportionate declines in bears, wolves and bald eagles." The amount of decline would not likely be proportionate, as salmon constitute only a portion of these species' diets.
- Throughout the Assessment, there is inconsistent information relating loss of fish habitat to a direct and quantifiable loss of fish production.

**V. Incomplete and selective discussion of socio-economic impacts and potential benefits of mining.**

The Assessment acknowledges the economic, social, and cultural benefits that the fish and wildlife resources provide to the residents of the region and the State. The Assessment does not consider any potential benefits of mine development to human health, safety, and welfare, including for those individuals who live in the region. The Assessment presents a limited and biased picture of only adverse impacts of a hypothetical mine, and fails to disclose to the public those benefits to the region and State that might result from large mine development.

References available from the State and PLP could have been used to describe additional economics regarding the positive impacts this type of development has already had in the region. The annual Alaska Mineral Industry Reports includes annual reported expenditures by the PLP on the Pebble project for 2006 -2010. For instance, in 2009 and 2010, respectively:

"The Pebble copper-gold-molybdenum project remained the largest exploration project in Alaska, with an announced 2009 budget of \$70 million. The budget, approximately 50 percent of the project's 2008 budget, included \$20 million for drilling, \$14 million for environmental studies, and \$36 million for engineering, cultural, community outreach, and other prefeasibility studies.

Approximately \$452 million has been spent on exploration at the Pebble project by Northern Dynasty Minerals Ltd., Anglo American Exploration (USA) Inc., and PLP from 2000 through 2009." (See *"Alaska's Mineral Industry 2009 Special Report 64, Department of Natural Resources, Division of Geological & Geophysical Surveys"*)

"The Pebble copper-gold-molybdenum project remained the largest exploration project in Alaska. Northern Dynasty Minerals Ltd. reported that the Pebble Partnership spent \$73 million on the Pebble project in 2010, with \$21 million spent on engineering studies, \$28 million on drilling, and \$24 million on environmental and socioeconomic studies." (See *"Alaska's Mineral Industry 2010 Special Report 65, Department of Natural Resources, Division of Geological & Geophysical Surveys"*)

## **VI. Unclear risk assessment methodology**

EPA relied upon the 1998 ecological risk assessment guidance (*Guidelines for Ecological Risk Assessment EPA/630/R-95/002F, April 1998*). That document is more appropriate for smaller scale studies where there are identified sources of constituents of concern, pathways and receptors in a clearly defined area.

- The document expands the concept of ecological risk assessment over a wide area whereas most risk assessments focus on a smaller area with known, not hypothetical impacts.
- Quantitative chemical risk estimates are presented without an initial discussion of the basic risk assessment process of data collection and evaluation, exposure assessment, toxicity assessment, and risk characterization.
- The Assessment discusses impacts on fisheries from normal operations and the probability of tailings dam failures and potential negative impacts from single and multiple mines, but fails to compare those statistics with probabilities of other potential negative impacts such as disease, blights, drought, or over-fishing. Consequently, there is no frame of reference for understanding the magnitude of the risk from the mine compared to other impacts to the area.

- Chapter 6 evaluates risk of engineered structure failure but not according to current industry and regulatory standards. The Assessment fails to recognize these basic risk management tools used by industry and regulators.

## **VII. Inconsistent scale and scope of project area**

The scope of the Assessment and methods for evaluating impacts of mining uses various geographic regions and scales of study, depending on the subject area and availability of information. Generally, four different geographic scales are applied to the study and include:

- The Bristol Bay Region, which encompasses the bay and the land area of six watersheds that drain into it;
- The Nushagak River and Kvichak River watershed, which comprise the largest of the Bristol Bay watershed's six watersheds and compose about 50% of the total Bristol Bay watershed area;
- The headwaters of the tributaries that flow within the proposed Pebble Project including: the North Fork Koktuli River, located to the northwest of the Pebble deposit, which flows into the Nushagak River via the Mulchatna River; the South Fork Koktuli River, which drains the Pebble deposit area and converges with the North Fork west of the Pebble deposit; and Upper Talarik Creek, which drains the eastern portion of the Pebble deposit and flows into the Kvichak River via Iliamna Lake; and The hypothetical mine site, which includes the area of direct impact as described in the hypothetical mine scenario.

Although the document is titled *An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska*, the Executive Summary limits the scope of the watershed assessment to the Nushagak and Kvichak River watersheds. However, in assessing potential impact of mining to the study area, most of the focus and discussion is limited to the area of the North Fork and South Fork Koktuli Rivers, Upper Talarik Creek and the hypothetical mine site.

While the presentation of the various geographic scales and associated information gives perspective to the expansive area that makes up the larger Bristol Bay region, the Assessment fails to address or quantify the potential impacts of the hypothetical mine as it relates to the various scales it presents.

As an example, if Bristol Bay has about 90,000 km of streams and Nushagak and Kvichak has about 58,000 km of streams, those numbers and associated

contribution to the respective fish contribution should be compared with the area of streams that would be impacted by the mine to give an overall perspective of impacts. The Assessment cites that 125.1 kilometers of streams would be lost for the maximum hypothetical mine scenario which would equate to an overall stream loss of 0.1 percent of the Bristol Bay watershed or about 0.2 percent of the Nushagak and Kvichak watersheds (Furthermore, presentation of kilometers down to the tenth of a kilometer implies a level of accuracy in impact assessment that is misleading). The Assessment fails to put into context how the loss of length of streams and habitat or area of wetlands directly relates to effects on fish production and the overall effect on subsistence, sport or commercial fishing at the larger scales. Without quantifying the effect of the impacts at each scale presented, the Assessment is essentially incomplete for the purpose of a risk assessment document.

### **VIII. Non-scientific presentation of the Assessment**

A scientific and technical assessment begins with a discussion of the array of issues and then continues through site-specific knowledge, logical narrowing down of issues to those that are most important and a conclusion. The State is concerned with the approach taken in the Assessment, which appears to begin with conclusions. Some sections, start with conclusions, and then subsequently follow with facts that support the conclusion. This approach is inappropriate for a scientific document developed by a regulatory agency that may be used as the basis for future decisions.

Common to every report section are lengthy descriptions of the high quality of Bristol Bay environmental conditions, productivity, habitat or importance to indigenous cultures. In a standard environmental document, such a description would be covered in one section of the document and would not need to be repeated throughout the report.

The organization of the multiple-volume Assessment encourages readers to form conclusions based on information in the Executive Summary alone. Information in the ES is presented differently than in the subsequent volume chapters and in the appendices. The stand alone ES includes photographs of landscape and fish from the Bristol Bay region that are not included in the Volume I Executive Summary. The stand alone ES also includes photographs of an open pit mine and washed out culverts from locations in Alaska outside of Bristol Bay. Whether intended or not, the stand-alone summary, with the potentially broadest audience, is inappropriately and selectively highlighting information. Additional discrepancies include:

- The data presentation from Assessment Volume I states that revenues from a hypothetical mine have been estimated to be between \$300 billion

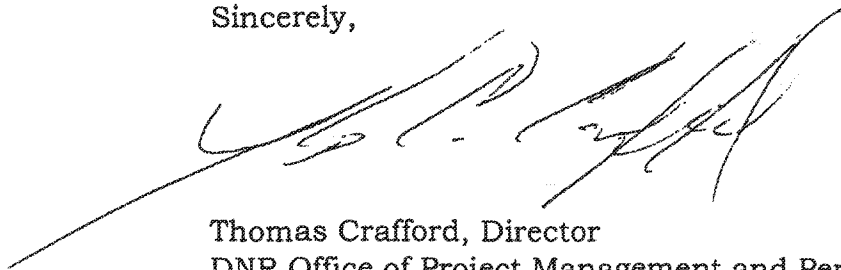
to \$500 billion over the life of the mine. This information was not included in the ES which would provide contrast to the current economics of the Bristol Bay watershed.

- Data are presented on potential acid rock drainage in the Assessment, a known concern for long-term impacts from sulfide ore mining. The text in Chapter 4 (pages 4-4 through 4-7) discusses the Bingham mine results from Utah, but does not refer to site-specific information from the potential Pebble site included in Appendix H.
- Figures in Chapter 2 exaggerate the area of the Pebble deposit. Using Figure 2-2 as an example, it could be argued that this scale is too small to accurately show the area, but perceptions and opinions of impacts are based on these figures. The maximum mine disturbance from the map on Page ES-17 is approximately 30.8 square miles, while the map of Figure 2-2 shows 116.4 square miles, based on the scale of the map.

In closing, the State believes the Assessment, as a precursor to EPA's decision on a pending Clean Water Act Section 404(c) petition, is too general and speculative. An assessment of environmental impacts of any proposed large mine or development project by the State and multiple federal agencies, including the Corps and EPA, would have much more scientific credibility within the context of an actual defined proposal.

Thank you for the opportunity to provide EPA with the State's technical comments on the draft Assessment. Should you have any questions, or wish to schedule a meeting to discuss the State's technical comments and concerns regarding the Assessment, please contact me at [tom.crafford@alaska.gov](mailto:tom.crafford@alaska.gov) or (907) 269-8629.

Sincerely,



Thomas Crafford, Director  
DNR Office of Project Management and Permitting

Enclosure:

**State of Alaska Technical Comments Docket EPA-HQ-ORD-2012-0276 (pp 89)**

cc. Ed Fogels (Alaska Department of Natural Resources Deputy Commissioner)  
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